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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,480	06/23/2003	William Y. Sinclair	Aries-35	2708

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CASELLA & HESPOS
274 MADISON AVENUE
NEW YORK, NY 10016

EXAMINER

NGUYEN, JIMMY

ART UNIT	PAPER NUMBER
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2829

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No. 10/602,480	Applicant(s) SINCLAIR, WILLIAM Y.	
	Examin r Jimmy Nguyen	Art Unit 2829	

-- Th MAILING DATE of this c mmunication appears on the cover she t with th correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-10 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 7 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0404</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazama (US 5990697).

As to claim 1, Kazama discloses (figs 1,2) an electrical test probe for a connector assembly comprising:

an elongated contact (6) having an intermediate collar (6a, flange); and

an elongated helical coil spring (7) disposed about said contact (6), with one end (the end carries the flange 6a) of the spring (7) bearing against one side of said intermediate collar (6a, flange) such that the plane (see attached with the yellow highline) of the spring (7) is at an acute angle (an angle which makes between the spring and the flange 6a) to said one side of the collar (6a, flange), and wherein the opposite end (the end carries the flange 5a) of the spring (7) includes contiguous spring coils (7), whereby, in operation, when the electrical probe (5, 6) is compressed between a printed circuit board (8) and an integrated circuit (9), the longitudinal axis (the center

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axis of the probe) of the contact is skewed to establish a direct electrical path between the contact (6) and the contiguous spring coils of the spring (7).

It would have been obvious to one having an ordinary skill in the art at the time of the invention was made to recognize that the center axis of the contact probe will be skewed (at a very small distance) at the time of the spring compress to provide the extra contact force for the pin.

As to claim 3, Kazama discloses (figs 1,2) an electrical test probe for a connector assembly as in claim 1 wherein said one end of the spring (7) includes contiguous spring coils (the other end of the spring 7 is also the coil spring).

As to claim 4, Kazama discloses (figs 1,2) an electrical test probe for a connector assembly as in claim 1 wherein the intermediate portion (the portion behind the projection 6b or 5b) of elongated helical coil spring (7) is of constant pitch (they have a constant diameter).

As to claim 7, Kazama discloses (figs 1 -3) an electrical test probe for a connector assembly as in claim 1 wherein the connector assembly includes a non-conductive substrate (2, 3, 4) having opposed 'top (3) and bottom (4) surface and a plurality of annular through holes (2a, 3a, 4a) extending between said top (3) and bottom (4) surface, each said through hole (2a, 3a, 4a) having an enlarged diameter (as seen in figures) portion intermediate said top (3) and bottom (4) surfaces, and wherein a

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plurality of electrical test probes (5, 6) corresponds to said plurality of through holes (2a,3a,4a) with each test probe (5,6) being disposed within a through hole (2a,3a,4a).

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kazama (US 5990697) in view of Barabi (US 6046597).

As to claim 2, Kazama discloses (figs 1, 2) all the limitation as explained in claim 1 above and the opposite end (5b) of said elongated contact (5) is disposed within said contiguous spring coils (7) of the helical coil spring.

However, Kazama is silent on the elongated contact has at one end thereof a crown configuration for engaging the solder ball of a BGA integrated circuit.

On the other hand, Barabi teaches (fig 3) the elongated contact (51) has at one end thereof a crown configuration (75) for engaging the solder ball (30) of a BGA integrated circuit (13).

It would have been obvious to one having an ordinary skill in the art at the time of the invention was made to use a crow tip of Barabi within the probe system of Kazama for the benefit of increasing the area of the conductor pin that actually comes into contact with the ball shaped contact points of the PC board and providing a good electrical contact (column 4 line 36 – 42).

2. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kazama (US 5990697) in view of Damon et al (us 4508405).

As to claim 6, Kazama discloses (figs 1, 2) all the limitation as explained in claim 1 above except for the helical coil spring is made of beryllium copper.

On the other hand, Damon et al teach the helical coil spring is made of beryllium copper (column 5 line 30 – 33).

It would have been obvious to one having an ordinary skill in the art at the time of the invention was made to modify the spring probe of Kazama to be made of beryllium copper as taught by Damon et al for the benefit of achieving a higher electrical resistance (column 5 line 34).

Allowable Subject Matter

3. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior arts of record are silent on the combination of the independent claim 1 with an electrical test probe for a connector assembly wherein the diameter of the contiguous spring coils at opposite end of the helical coil is of smaller diameter than the diameter of the coils at said one end of the spring. Further, the smaller diameter of the coil spring at one end will provide more contact force and retract

force for the pin when the spring compress or de-compress, therefore it enables to provide a better contact.

4. Claims 8 –10 are allowed over the prior arts of record.

The prior arts of record disclose a connector assembly for forming a plurality of electrical connections between an integrated circuit package and a printed circuit board, said connector assembly comprising:

a non-conductive substrate having opposed top and bottom surface and a plurality of annular through holes extending between said top and bottom surfaces, and

a plurality of resilient electrical probes corresponding to said plurality of through holes, each said electrical probe being formed from an elongated contact and a helical spring,

said an intermediate enlarged diameter collar portion disposed within said enlarged diameter portion of said through hole, with a first end of said elongated contact extending beyond the top surface of said substrate, while the second end of said elongated contact is disposed within said through hole and is of smaller diameter than said collar portion thereof.

However, the prior arts of record are silent on the above limitation combine with said elongated helical spring being disposed about said elongated contact and having an upper portion, an intermediate portion, and a lower portion, said upper spring portion bearing against one side of said enlarged

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diameter collar and being tightly wound such that the coils thereof are contiguous, said intermediate spring portion being wholly disposed within Said through hole and being of a diameter greater than the diameter of said second end of the elongated contact and said lower spring portion being also tightly wound such that the coils are contiguous, said lower spring portion being of a diameter smaller than the through hole at the bottom surface of the substrate so as to extend beyond said bottom surface for connection to a printed circuit board whereby, in the operative position of the electrical probe, the collar of the elongated contact bears against the upper portion of said spring resulting in tilting of said elongated contact such that the second end thereof makes electrical contact with said lower spring portion. Further, the smaller diameter of the coil spring at one end will provide more contact force and retract force for the pin when the spring compress or de-compress, therefore it enables to provide a better contact.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Nguyen at (703) 306-5858. Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4900.



JN.

April 7, 2004

Fig. 1

